



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

hostage to the United States. But what if Canada, on the outbreak of war, should be found placidly within our lines and yet not a hostage? What if the Dominion should declare her independence as soon as war became imminent?

That the Canadian people might decently take that course rather than risk invasion because of a dispute about Venezuela may be asserted reasonably. That they would take it, if moved by consideration for Great Britain's interests, seems plain; for thus they would relieve the old country from defending, and bar the United States from attacking, the Dominion. Then the British Navy and the New Navy might try conclusions.

It is a fine question whether Mr. Cleveland's cruisers and privateers, by levying on Queen Victoria's ocean traffic, could make more than her iron-clads might by requisitioning the great American cities of two oceans. Possibly the more grey and bald-headed eagles aforementioned may conceive of Mr. Rudyard Kipling viewing that fine question with unholy glee, or a council of British admirals regarding it with tender recollections of Blucher's "*Was für plunder!*"

EDWARD W. THOMSON.

WHAT IS MALARIA ?

THE word malaria was originally used to designate "bad air" or air contaminated with noxious gases, and these were supposed to be the cause of miasmatic or swamp disease. The Roman marshes, so far as we can ascertain, afforded the first cases of diseases of this type which were recorded in writing, though, of course, mankind "shivered and burned" with malarial paroxysm ages before the historical Roman plains were known. About twenty years ago medical men began to realize that malarial fevers were caused by some agent other than "bad air." A poisonous something associated with noxious gases, but quite apart from them, evidently lay at the root of the manifestations which they knew as paludal or marsh disease. But even the light of science, in which they saw more clearly this additional cause, failed to make them discard the time-honored name malaria, and to-day it still stands for the class of ailments whose symptoms we know so well.

Various theories have been advanced in the past to account for the actual cause of malaria. The subtle nature of the poison has given some observers courage even to deny its existence. It was asserted by one eminent authority that the so-called malarial diseases were due solely to cold and chill after exposure to great heat; especially when the body was exhausted by toil and fatigue. There can be but little doubt that such conditions are predisposing causes of malaria—that they render the system susceptible to its poison. But this is true of any of the germ diseases and to-day we know malaria to be a germ disease.

In 1881 Alphonse Laveran, a French physician, discovered in the blood of persons suffering from malarial fevers a microscopic organism which was never found in the blood of persons in health. At first very little attention was paid to his announcement; few had ever heard of him, and the scientific world was committed to the alleged discovery of Professors Klebs and Tommaso-Crudelli of a bacillus of malaria having quite different characteristics. Other observers, after a time, confirmed Laveran's statements, but failed to do so in the case of the alleged Klebs bacillus.

Laveran's discovery has been called the plasmodium of malaria, although he himself called it *oscillaria malariae*, because of the peculiar oscillating movements it made.

The parasites are found within the red blood corpuscles, and also free in the blood. They are classed among the protozoa, *i. e.*, they are one-celled animalculous vegetables. So constantly are these little organisms found in the blood of persons suffering from malaria that we can tell to a certainty whether a case of fever is malaria and requires a certain line of treatment, by examining under the microscope a drop of blood taken from the finger of the patient. The blood may be examined fresh, without any special preparation. The finger or the lobe of the ear is simply pricked with the point of a sharp lancet, and a drop half the size of the head of a pin is placed on a clean cover glass, such as is used for microscopic specimens. This is then put on a glass slide under a very powerful microscope, when the plasmodia can be seen in the form of minute round bodies within the red blood corpuscles and of larger spheres, often having one or a number of black specks in their center, floating with the corpuscles free in the blood.

Other forms of the plasmodium have been described. Some of them have hair-like filaments projecting from them; others are shaped like rosettes, others again are crescent shaped.

Laveran maintains these shapes are different stages of development of the same kind of plasmodia. Other observers claim that the different shaped plasmodia cause different types of malarial fevers. For example, one kind producing ordinary ague, another pernicious malarial fever, another intermittent fever, and so on. Laveran himself admits, however, that the crescent-shaped bodies are seen oftenest in relapsing fever and in malarial anæmia.

Some of the views of the Italian school—which holds in the main to Laveran's plasmodia, but believes that each type of malaria has a plasmodium of a different kind—are borne out by the peculiar characteristics of the disease. Thus they claim that the plasmodia develop inside of the red corpuscle and each phase of their development marks a phase in the development of the disease. First a small plasmodium appears within the corpuscle, and this gradually increases in size eating the corpuscle up, so to speak, as it does so. Then the little specks, already referred to, appear, these being broken up, destroyed pieces of the red corpuscles. The plasmodium then begins to segment or divide into several new plasmodia.

When the segmentation is completed the blood corpuscle, which now contains four to six new plasmodia, begins to lose its characteristics until it entirely disappears, destroyed by the parasites. The latter then float free in the blood serum until each finds lodgment in a new corpuscle when it recommences a new cycle of existence. The time occupied by the various phases of development of the plasmodia determines the periods of the disease, *i. e.*, whether the fever be every fourth day, every third day or every other day and so on.

The plasmodia do not have things quite their own way, however, for the phagocytes of the blood are their deadly enemies. These are the white blood corpuscles, little round white globes endowed with a peculiar motion like that of a certain jelly-fish. The phagocytes have been likened to soldiers, for they bear the same relation to the economy of the blood as do soldiers to the economy of the nation. They have also been called "The policemen of the blood." They destroy harmful invaders. The plasmodia are eaten up, so to

speak, by the phagocytes. The phagocytes can be seen with whole plasmodia in them, or with fragments, or with only the granules or little black pieces of red blood corpuscles, to which reference has been made.

Quinine is especially deadly to the development and life of the plasmodia. Thus we can account rationally and theoretically for its beneficial effects in the treatment of malarial diseases. The use of the drug—for which we are indebted to the instinct, perhaps, of the Peruvian Indian, or at least to pure empiricism—is placed upon a true scientific basis.

Without doubt, the malarial plasmodium is developed outside of the body in decaying organic matter, particularly in swampy districts. Nevertheless, this has not been proven, for it has never been seen or cultivated like other disease germs outside of the body. Many scientists believe it to be a water germ, and to be principally transferred to man through the medium of drinking water. Some have advanced the theory that mosquitoes carry it and inoculate man when they insert their probosces in the flesh! The facts, however, I think, bear out the conclusion that it may be taken in with the air breathed, that it is air-born and from the earth where it finds its origin.

We might sum up our knowledge of malaria about as follows:

1st. Malaria is caused by a germ or parasite.

2d. These parasites destroy the red blood corpuscles.

3d. They complete in the blood a cycle of existence which corresponds to the stages of the disease.

4th. The plasmodia not only attack the red blood corpuscles but also effect certain changes in other tissues of the body, particularly the spleen, kidneys and bone marrow.

In addition to these conclusions it seems probable that different kinds of malarial diseases are caused by different varieties of plasmodia.

CYRUS EDSON.

THE FUNCTION OF PUBLIC EDUCATION.

THE large and growing interest in the subject of public education finds voice, not only in private discussion, but in the number of articles that are constantly being written upon the subject. In following the latter, one cannot help noticing how diverse, and often confusing, are the ideas advanced. The writers start from differing premises, but generally come to some vague conclusions about the necessity of more and better educational facilities. In all this, the distinction between education in general, and state education in particular, appears to be lost sight of completely. School boards are criticised and belabored, the most elaborate and expensive systems are strenuously advised, and it is assumed that it is the business of the state to furnish all the higher education that the rising generation may find useful. Much confusion would be avoided, and the discussions less at cross-purposes, if writers would clearly define what they mean by public education. Why does the state educate? and how far should it educate? If any substantial unanimity upon these questions could be arrived at, the whole problem would be simplified, and the direction of advance be clear and assured.

Before attempting to answer the above query, it may be well to bring out the negative side of the question. The state does not educate for charity.